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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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|--|--|---|--|
| Applicant's or agent's file reference  |  | <b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) |  |
| P26,190A PCT   |  |   |  |
| International application No.  | International filing date (day/month/year) | Priority date (day/month/year)  |  |
| PCT/US04/13413   | 30 April 2004 (30.04.2004)                 | 01 May 2003 (01.05.2003)  |  |
| International Patent Classification (IPC) or national classification and IPC   |  |   |  |
| IPC(7): C08K 5/55; C08L 27/12; F28F 7/00 and US Cl.: 524/185,544,545; 165/185  |  |   |  |
| Applicant  |  |   |  |
| MARKEL CORP  |  |   |  |
| <p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of ___ sheets.</p> <p>3. This report contains indications relating to the following items:</p> <p>I <input checked="" type="checkbox"/> Basis of the report</p> <p>II <input type="checkbox"/> Priority</p> <p>III <input type="checkbox"/> Non-establishment of report with regard to novelty, inventive step and industrial applicability</p> <p>IV <input type="checkbox"/> Lack of unity of invention</p> <p>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p>VI <input type="checkbox"/> Certain documents cited</p> <p>VII <input type="checkbox"/> Certain defects in the international application</p> <p>VIII <input type="checkbox"/> Certain observations on the international application</p> |  |   |  |
| Date of submission of the demand   |  | Date of completion of this report   |  |
| 0 November 2004 (30.11.2004)   |  | 13 April 2005 (13.04.2005)  |  |
| Name and mailing address of the IPEA/US<br>Mail Stop PCT, Attn: IPEA/ US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (703) 305-3230<br>Form PCT/IPEA/409 (cover sheet)(July 1998)   |  | Authorized officer<br>Vickey Ronesi<br>Telephone No. (571) 272-1700   |  |

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/US04/13413

## I. Basis of the report

## 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed.
- ☒ the description:  
pages 1-9 as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages 10-11, as originally filed  
pages NONE, as amended (together with any statement) under Article 19  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_
- ☐ the drawings:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
pages NONE, as originally filed  
pages NONE, filed with the demand  
pages NONE, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

- ☐ the description, pages NONE
- ☐ the claims, Nos. NONE
- ☐ the drawings, sheets/figs NONE

- ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).  
\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/US04/13413

## V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. STATEMENT

|                               |                    |     |
|-------------------------------|--------------------|-----|
| Novelty (N)                   | Claims <u>NONE</u> | YES |
|                               | Claims <u>1-11</u> | NO  |
| Inventive Step (IS)           | Claims <u>NONE</u> | YES |
|                               | Claims <u>1-11</u> | NO  |
| Industrial Applicability (IA) | Claims <u>1-11</u> | YES |
|                               | Claims <u>NONE</u> | NO  |

### 2. CITATIONS AND EXPLANATIONS

Claims 1-11 lack novelty under PCT Article 33(2) as being anticipated by Latham et al (US 5,011,872).

Latham et al discloses a thermal conductive polymer composition used in heat transfer materials comprising a carrier material such as a fluorocarbon polymer in an amount ranging from 25 to 90 vol % and an inorganic filler such as boron nitride in an amount ranging from 10 to 75 vol % that exhibits a thermal conductivity that is greater than  $10 \text{ W m}^{-1} \text{ K}^{-1}$  (claims 1-4, col. 2, lines 6-8, 33-36, 47-50, col. 3, lines 15-22). Note col. 3, line 46 where a fluorocarbon/boron nitride composite is exemplified. It is noted that the approximate densities of fluorocarbon polymers and boron nitride are about equal ( $\sim 2.2 \text{ g cm}^{-3}$ , see *CRC Handbook of Chemistry and Physics*, 84<sup>th</sup> Edition, page 4-47 and *Polymer Handbook*, 4<sup>th</sup> Edition, page V-39) thereby allowing for direct comparisons between wt % (presently claimed composition) and vol % (referenced composition).

Claims 1-11 lack novelty under PCT Article 33(2) as being anticipated by Okuda et al (US 6,246,035 B1).

Okuda et al discloses a heating device that includes an elastic layer containing a fluorine rubber in an amount ranging from 50 to 95 wt % and a filler such as boron nitride in an amount ranging from 5 to 50 wt % that exhibits a thermal conductivity of at least  $0.04 \text{ cal cm}^{-1} \text{ s}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , i.e., at least  $16.7 \text{ W m}^{-1} \text{ K}^{-1}$  (abstract, claims 1-4, 6, and 9, col. 5, lines 27-38).

Claims 1-4 and 8-11 lack novelty under PCT Article 33(2) as being anticipated by Nakajima et al (JP 56-000837 A).

Nakajima et al discloses a heat-radiating sheet having excellent thermal conductivity comprising a synthetic rubber such as a fluororubber and inorganic fillers in an amount ranging from 35 to 70 vol % which includes boron nitride and at least one other filler where the ratio of boron nitride to the other filler(s) ranges from 0.3:1 to 3:1 (abstract). When the composition and filler ratios are taken into account, the amount the boron nitride in the rubber composite ranges from 8.75 to 52.5 vol %. Note the table on page 271 which gives thermal conductivity values for ranging from  $1.7$  to  $8.6 \times 10^{-3} \text{ cal cm}^{-1} \text{ s}^{-1} \text{ }^{\circ}\text{C}^{-1}$ , i.e.,  $0.71$  to  $3.60 \text{ W m}^{-1} \text{ K}^{-1}$ . Note that wt % and vol % compositions are comparable because of approximately equal densities as discussed in the first paragraph.

Claims 1-2, 4-5, and 8-11 lack novelty under PCT Article 33(2) as being anticipated by Sagal et al (US 2003/0043586 A1).

Sagal et al discloses a thermally conductive lamp reflector whose shell is made from a composition comprising a base polymer matrix such as a fluorocarbon polymer in an amount ranging from about 30 to about 80 vol % and a thermally conductive filler material such as boron nitride in an amount ranging from about 20 to about 70 vol % that exhibits a thermal conductivity of at least  $3 \text{ W m}^{-1} \text{ K}^{-1}$ , preferably greater than  $22 \text{ W m}^{-1} \text{ K}^{-1}$ . Note that wt % and vol % compositions are comparable because of approximately equal densities as discussed in the first paragraph.

Claims 1-7 and 11 lack novelty under PCT Article 33(2) as being anticipated by Derwent Abstract 1980-29808 C of JP 55017944 A (Sumitomo).

Sumitomo discloses a roller with a fluorocarbon resin layer comprising a fluorocarbon resin layer in an amount of 70 to 95 wt % and a filler such as boron nitride in an amount of 5 to 30 wt % that exhibits "good thermal conductivity."

Claims 1-11 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

NEW CITATIONS